GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

Date: January 19, 1981

Project Title: Independent Scientific Assessment of the Environmental Effects of the Clean-up of Three Mile Island

Project No: E-26-671

Project Director: Dr. B. Kahn

Sponsor: U. S. Environmental Protection Agency; Washington, DC 20460

Agreement Period: From 12/12/80 Until 3/15/81 (R&D Perf. & Rept. Period)

Type Agreement: Cooperative Agreement No. CX808867-01-0

Amount:

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1,706	E-26-323
$34,114	TOTAL

Reports Required: Final Report

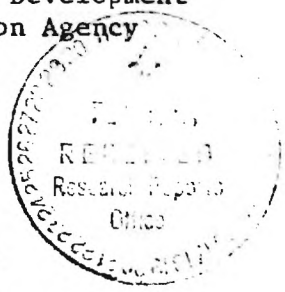
Sponsor Contact Person (s):

Technical Matters
EPA Project Officer
H. Matthew Bills
Associate Deputy Assistant Administrator
Office of Monitoring and Technical Support (RD-680)
Office of Research and Development
Environmental Protection Agency
Washington, DC 20460
202/426-4452

Contractual Matters
(thru OCA)

Grants Specialist
Adelaide S. Lilly, 202/755-3490

Frederick L. Meadows
Chief, Grants Operations Branch (PM-216)
Grants Administration Division
Environmental Protection Agency
Washington, DC 20460



Defense Priority Rating: None

Assigned to: Nuclear Engineering (School/Laboratory)

COPIES TO:

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- Project File (OCA)
- Project Code (GTRI)
- Other Mr. C. E. Smith

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION

Date: 7/31/81

Project Title: Independent Scientific Assessment of Environmental Effects of the Clean-Up of Three Mile Island

Project No: E-26-671

Project Director: Dr. B. Kahn

Sponsor: EPA, Washington, D.C.

Effective Termination Date: 3/15/81

Clearance of Accounting Charges: 3/15/81

Grant/Contract Closeout Actions Remaining:

- [x] Final Invoice and Closing Documents
- [ ] Final Fiscal Report
- [x] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _____

Assigned to: Nuclear Engineering (School/Lab~~oratory~~)

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Other: _____

E-26-671

January 16, 1981

The Honorable Douglas Costle, Administrator
US Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Dear Sir:

This letter responds to your request that we review the Draft Programmatic Environmental Impact Statement (PEIS) related to . . . Three Mile Island Nuclear Power Station, Unit 2 (TMI-2), Report NUREG-0683. The charge to the Committee called for an independent assessment, to be completed before January 20, 1981. We concluded that we could be most effective in the limited time available by identifying the major needs for improving the Draft PEIS and by citing important examples; and that we should recommend a detailed review of the Final PEIS which is concurrently being prepared by U.S. Nuclear Regulatory Commission (NRC) staff.

The Committee was organized on December 2, 1980 and met subsequently on December 20, 1980 and January 9, 1981. In the course of our review we read the Draft PEIS and the comments concerning it that are on file with the NRC; visited Three Mile Island; and met with Mr. Lawrence King and associates responsible for TMI-2 recovery operations by the station operator, with Dr. Bernard Snyder of the NRC and his associates who are responsible for preparing the PEIS, and with Dr. George Tokuhata, Director, Division of Epidemiological Research, Pennsylvania Department of Health.

The meeting with NRC staff confirmed our conclusion that the Final PEIS should be given the detailed assessment that we had initially wished to apply to the Draft PEIS. In response to our questions, Dr. Snyder and his associates informed us that the changes from Draft to Final PEIS were not substantive, although many of our concerns were being addressed. In general, the changes are intended to make the PEIS more understandable, to respond to the filed comments, and to correct errors. We learned, however, that -- in view of the long-past deadline for submitting comments to the Draft PEIS and the urgency in completing the Final PEIS by the end of next month -- neither would our assessment be considered in preparing the Final PEIS nor could we read parts of it before the completion date to determine whether our concerns had been answered.

At the beginning of our assessment, we wish to indicate our strong support of the principle that decontamination to allow fuel removal from TMI-2 should be performed as promptly as is consistent with maintaining public health and safety and subjecting the procedure to public review. The decontamination options to be considered in full should include both those that allow and those that preclude restarting the reactor.

The Draft PEIS addresses an enormously complex problem. In our view, however, a number of reasonable options and the associated magnitude of their costs and hazards have not been adequately considered. We wish to alert you in this letter to the following major items of concern that must be treated with thoroughness before we could view the Final PEIS as acceptable.

- Consider transportation of radioactive wastes from TMI-2 to other locations for treatment, storage or disposal as an alternative to performing these activities on site. We believe that this option is technically feasible and recommend prompt development of the needed criteria for classifying these radioactive wastes according to operationally useful categories; modification of regulations that inhibit removal of radioactive wastes to more suitable locations, under emergency designation if necessary; and formulation of radiological cleanup management programs for systematic response to similar accidents.
- Present the estimated cost of each option to permit cost/benefit and ALARA evaluations or at least to indicate by orders of magnitude whether certain options are feasible.
- Treat scientifically the considerations of psychological stress -and fear. The quality of the discussion of psychological stress is seriously deficient. The frequent characterization of public anxiety as "phobic" or pathological denigrates the legitimate concerns of the local populace and could call into question the objectivity of the analysis. Insufficient scientific evidence and analysis are provided to estimate reasonably the magnitude of the potential psychological, public health, and community impacts. Additionally, the failure to relate specific alternatives to likely behavioral consequences does not allow discrimination among major decontamination choices.

- Provide quantitative estimates of socioeconomic impacts, consider the resulting alternatives in detail and include them in summary impact statements. The treatment of socioeconomic impacts is superficial and of a lower scientific quality than that which characterizes the statement as a whole. In particular, a lack of quantitative estimates and requisite supporting analyses is apparent throughout. This has led to questionable assumptions and judgments, as exemplified by the discussions of potential impacts upon commercial Chesapeake Bay fisheries and the local tourist industry. The socioeconomic impacts of discharging treated radioactive waste water to the Susquehanna River and of alternatives to such releases must be considered even when discharges are scientifically acceptable at doses to persons less than those specified in Appendix I to 10 CFR Part 50.

- Discuss the ranges of uncertainty related to risk estimates, dose factors, and environmental transfer factors that are used throughout the PEIS. Use the BEIR-3 report to determine risks and indicate the range of opinions in the scientific community concerning risk. Similarly, include the proper scientific review, documentations, and rationale for the expected effects from radiation on aquatic organisms and the natural resources of the Susquehanna River and Chesapeake Bay. Indicate the extent of possible deviations from generic transfer and dose factors for critical radionuclides such as H-3, Sr-90, and Cs-137, and provide references to available documents to support the specified factors.

- Include all of the information needed to follow the radiological impact calculations in the Draft PEIS. Needed are the calculated amounts of generated radionuclides; the estimated distribution of these radionuclides among the fuel, reactor components, reactor system demineralizer, reactor coolant water, containment building surfaces, sump water, etc.; environmental transfer and dose factors for individual radionuclides; and doses listed separately by radionuclide and pathway.

- Use the Summary and Conclusion sections to present cost-benefit balances, discuss tradeoffs for alternatives, and quantify at least the ranges of impacts for options that can not be precisely evaluated at this time.

To illustrate the nature of these general concerns, we present here a partial list of issues, focused on radiological concerns:

- The Draft PEIS indicates that the collective dose equivalent is far greater to workers at TMI-2 than to persons in the environment. We recommend that estimation of the range of these doses be given considerably greater attention; that the means of determining these doses be described more thoroughly; that the registry of exposed workers be better defined; and that provisions for a study of effects be considered for this most exposed population group.

- The controversies leading to the delay in publishing the BEIR-3 report and the minority report issued in it testify to the differences in opinion and the problems involved in presenting to the public a credible, defensible, and understandable interpretation of the level of risk associated with exposure to low levels of radiations (below 5-50 rem). This situation imposes the responsibility that the PEIS be written in a manner that truly informs the public by presenting radiation risk estimates that acknowledge either the level of uncertainty of the data on which they depend or the range of upper and lower bounds of risk associated with different schools of thought within the scientific community.

- The effects of other potential accidents should be considered, notably (1) a zirconium hydride explosion (as suggested by Gulbransen's comments on the Draft PEIS); (2) a criticality accident while the equipment hatch to the containment building is being used; and (3) a relatively high-level radioactive water leak onto the ground or into drains during transfer out of the containment building.

- In the treatment of radioactive liquid wastes onsite, (1) the operator may encounter complications due to the multiple uses of the fuel pools, (2) the integrity of the radioactive demineralizer containers over the long term is in question, and (3) the predicted decontamination factors for treating contaminated water may not be attained. The Draft PEIS does not discuss radiation doses or contamination problems that might arise from the need to remove the contaminated water tank farm and submerged demineralizer system (SDS) from the fuel pools. The stability of the EPICOR-II and SDS demineralizers for retaining radioactive materials can not be evaluated on the basis of the Draft PEIS due to their proprietary nature, but the possibility of inadequate immobilization has been raised in the report by Barletta et al. (BNL, May 1980) and evidence of leakage from liners may have been found recently by the TMI operator. The radionuclide decontamination factors for

the SDS, calculated in the Draft PEIS for reactor building sump water, appear to be overly optimistic according to preliminary tests (Campbell et al., ORNL/TM-7448). Additional treatment to reduce concentrations to those predicted for radioactive liquid waste upon discharge to the Susquehanna River may involve additional doses to workers or environmental impacts.

- Consideration of the discharge of treated radioactive liquid waste to the Susquehanna River by the Draft PEIS appears (1) to limit the possible options by hypothesizing continuous discharge during flow rates of 1700 or 10,000 cfs, (2) to treat possible bioaccumulation pathways without sufficient consideration of site-specific data, and (3) to be in error by three orders of magnitude for the dose from reactor building sump water. The dose equivalent due to drinking water that contains the liquid effluent appears to be 0.2 mrem from H-3 alone rather than 2.2×10^{-4} mrem (Table 6.3-12) from all radionuclides on the basis of H-3 concentrations in the Draft PEIS.

We have kept our review brief to give you a clear overview but would be glad to amplify any of our comments. Please let us know if you wish us to continue with this effort by assessing the Final PEIS.

We wish to thank the U.S. EPA staff members -- Mr. Matthew Bills and Dr. William Kirk -- for their untiring assistance and the above-cited persons for meeting with us.

Respectfully yours,

Bernd Kahn, Director
Environmental Resources Center
Georgia Institute of Technology

Roger Kasperson
Center for Technology Environment Dev.
Clark University

Joseph A. Mihursky, Professor
Center for Env'l and Estuar. Studies
University of Maryland

Kenneth L. Miller, Director
Division of Health Physics
Hershey Medical Center

John L. Randall, M.D., Assoc. Dir.
Dept. of Family and Comm. Medicine
Lancaster General Hospital

Raymond Seltser, M.D., Professor
School of Hygiene and Public Health
The Johns Hopkins University

Ivar E. Strand, Professor
Agricultural Economics Dept.
University of Maryland

Gordon Thompson
Union of Concerned Scientists
Cambridge, MA

James E. Watson, Jr., Director
Radiological Hygiene Program
University of North Carolina

Paul L. Ziemer, Professor
Bionucleonics Department
Purdue University